

REMARKS

Claims 37-60 remain in this application. Claims 1-4 and 22-36 have been cancelled without prejudice to their subsequent reinstatement. Claims 37-60 have been added. The Applicants respectfully request reconsideration of this application in view of the above amendments and the following remarks.

Initialization Of IDS References

As a preliminary matter, the Examiner did not indicate that certain references were considered and made of record by initialing the corresponding box on the PTO-1449 form mailed August 25, 2004. The Examiner stated that these references were not considered because the dates of the references were not included. Applicants submit these references herewith in an IDS where the dates are included and respectfully request that the Examiner consider these references.

35 U.S.C. §102(b) Rejection - Shi

The Examiner has rejected claims 1, 2, 4, 25-29 and 34-36 under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 6,100,012 issued to Shi (hereinafter referred to as "Shi"). These claims have been cancelled. The Applicants respectfully submit that the present claims are allowable over Shi.

Claim 37 recites a method comprising "*creating an exposure image in a radiation sensitive layer by exposing the radiation sensitive layer to patterned radiation; and modifying the exposure image by treating the exposure image with a heterogeneous thermal treatment including different heat flux*". Shi does not teach or suggest treating the exposure image with a heterogeneous thermal treatment including **different heat flux**.

Shi discusses an infra-red radiation post-exposure bake process for chemically amplified resist lithography (see Title). As discussed in Shi, the use of infrared radiation with a wavenumber that is preferentially absorbed in the DUV-exposed regions of the chemically amplified resist selectively increases the temperature of the DUV-exposed regions, while maintaining the temperature in the DUV-unexposed regions relatively low (see Abstract). Additionally, Shi discusses that the IR source should be designed to supply IR radiation uniformly across the chemically amplified resist layer. Accordingly, Shi discusses that infrared radiation, rather than heat flux, should be provided to the resist layer. Additionally, Shi discusses that the infrared radiation should be provided uniformly across the resist layer. Accordingly, there is no teaching or suggestion of modifying the exposure image by treating the exposure image with a heterogeneous thermal treatment including different heat flux.

Anticipation under 35 U.S.C. Section 102 requires every element of the claimed invention be identically shown in a single prior art reference. The Federal Circuit has indicated that the standard for measuring lack of novelty by anticipation is strict identity. *“For a prior art reference to anticipate in terms of 35 U.S.C. Section 102, every element of the claimed invention must be identically shown in a single reference.”* In *Re Bond*, 910 F.2d 831, 15 USPQ.2d 1566 (Fed. Cir. 1990).

For at least these reasons, **claim 37** is believed to be allowable over Shi. **Claims 38-49** depend from claim 37 and are believed to be allowable therefor, as well as for the recitations independently set forth therein.

Claim 50 recites a method comprising *“creating an exposure image in a radiation sensitive layer by exposing the radiation sensitive layer to patterned radiation; and reducing one or more errors in the exposure image by treating the exposure image with a heterogeneous thermal treatment”*. Shi does not teach or suggest reducing one or more

errors in the exposure image by treating the exposure image with a heterogeneous thermal treatment.

As discussed above, Shi discusses an infra-red radiation post-exposure bake process for chemically amplified resist lithography (see Title). The process improves critical dimension control during the post exposure bake (see Abstract, first sentence). The use of infrared radiation with a wavenumber that is preferentially absorbed in the DUV-exposed regions of the chemically amplified resist selectively increases the temperature of the DUV-exposed regions, while maintaining the temperature in the DUV-unexposed regions relatively low. The increased temperature initiates and accelerates acid catalyzed chemical transformation of the resist polymer in the DUV-exposed regions. The lower temperature in the DUV-unexposed regions suppresses the diffusion/migration of acid catalyst into those regions from the DUV-exposed regions. As understood by Applicants, this allegedly improves critical dimension control during the post exposure bake. However, Shi does not teach or suggest reducing errors already present in the exposure image due to the lithographic exposure process. Rather, Shi discusses improving critical dimension control during the post exposure bake by using infrared radiation, which is different. There is no teaching or suggestion in Shi to reduce one or more errors in the exposure image by treating the exposure image with a heterogeneous thermal treatment.

Anticipation under 35 U.S.C. Section 102 requires every element of the claimed invention be identically shown in a single prior art reference. The Federal Circuit has indicated that the standard for measuring lack of novelty by anticipation is strict identity. *“For a prior art reference to anticipate in terms of 35 U.S.C. Section 102, every element of the claimed invention must be identically shown in a single reference.”* In *Re Bond*, 910 F.2d 831, 15 USPQ.2d 1566 (Fed. Cir. 1990).

For at least these reasons, **claim 50** is believed to be allowable over Shi. **Claims 51-60** depend from claim 50 and are believed to be allowable therefor, as well as for the recitations independently set forth therein.

35 U.S.C. §103(a) Rejection –Shi in view of Kulp

The Examiner has rejected claims 3, 22-24, 30-33 under 35 U.S.C. §103(a) as being unpatentable over Shi in view of U.S. Patent No. 6,169,274 issued to Kulp ("Kulp"). These claims have been cancelled. The present claims are believed to be allowable.

Firstly, Shi and Kulp should not be combined. Shi discusses an infra-red radiation post-exposure bake process for chemically amplified resist lithography (see Title). Kulp discusses controlling the heating or cooling of a holding plate based on first and second temperature sensors disposed in the holding plate (see Abstract). Accordingly, these references discuss different approaches for performing a post exposure bake. Shi is based on infrared radiation heating. Kulp is based on a heated holding plate. Applicants submit that it would not be obvious to combine features of an infrared radiation post exposure bake apparatus with features of a heated holding plate apparatus.

Secondly, even if Shi and Kulp are combined -- which as discussed above does not even seem appropriate -- any combination still does not teach or suggest the claim limitations that the Examiner asserted it teaches. In particular, contrary to the Examiners assertions, Kulp does not teach or suggest specifying a heterogeneous thermal treatment by adjusting a height adjustable spacer or plurality of height adjustable spacers (as formerly recited in claims 3, 24, 30, and 33); nor does Kulp teach or suggest a screw (as formerly recited in claims 22 and 31); nor does Kulp teach or suggest a piezoelectric

substance (as formerly recited in claims 23 and 32). Applicants have carefully reviewed Shi and Kulp and have found no mention whatsoever of any of these claim limitations in either Shi or Kulp.

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the references or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) **must teach or suggest all the claim limitations** (emphasis added). The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on Applicant's disclosure. In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

For the foregoing reasons, Applicants submit that the Examiner has failed to establish a *prima facie* case of obviousness. Specifically, the Examiner has failed to show that the teaching or suggestion to make the claimed combination is found in the prior art, and not based on Applicant's disclosure, which is required.

For at least these reasons, claims 38-41 and 51-54, which each independently include one or more limitations similar to those of the erroneously rejected claims 3, 22-24, 30-33, are believed to be allowable.

Conclusion

In view of the foregoing, it is believed that all claims now pending patentably define the subject invention over the prior art of record and are in condition for allowance. Applicants respectfully request that the rejections be withdrawn and the claims be allowed at the earliest possible date.

Request For Telephone Interview

The Examiner is invited to call Brent E. Vecchia at (303) 740-1980 if there remains any issue with allowance of the case.

Request For An Extension Of Time

The Applicants respectfully petition for an extension of time to respond to the outstanding Office Action pursuant to 37 C.F.R. § 1.136(a) should one be necessary. Please charge our Deposit Account No. 02-2666 to cover the necessary fee under 37 C.F.R. § 1.17 for such an extension.

Charge Our Deposit Account

Please charge any shortage to our Deposit Account No. 02-2666.

Respectfully submitted,
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